REMARKS

Applicants acknowledge with appreciation the courtesy of the interview extended the undersigned attorney and Edwin A. Sisson, Esq, also Applicants' attorney, by Examiner Listvoyb and Primary Examiner Rabon Sergent on June 12, 2008. During the interview the outstanding rejection and the distinguishing features of the claimed invention over the prior art of record were discussed. No agree was reached at the interview.

Applicants have amended the claims to more particularly define the invention taking into consideration the outstanding rejection and the interview with the Examiners by adding new claims 109 and 111 to the application to further specific aspects of the invention as fully supported by the specification as originally filed. In this regard, please see pages 9 and 10 of the specification. In addition, claims 57, 58, 64-83 and 108 have been cancelled from the application without prejudice or disclaimer subject to the right to file a divisional application thereto. These claims stand withdrawn from consideration in the outstanding Official Action as being directed to non-elected subject matter. As noted, the election was made without traverse. All of the claims now present in the application are in full compliance with 35 USC 112 and are clearly patentable over the references of record.

The rejection of claims 56, 59-63, 84-92, 95, 97, 101-107 under 35 U.S.C. §103(a) as being obvious over Coover, Jr. et al. (US Pat. No. 3,075,952, hereinafter, Coover) in combination with Kerpes as evidenced by Jones has been carefully considered but is most respectfully traversed.

The Official Action urges that Coover discloses preparing a mass of polyester prepolymer particles comprising at least one polyester with reference to Examples 1A and 1B. At the outset, Applicants wish to note that the prepolymer used by Coover is prepared using a titanium catalyst. As set forth at column 3, lines 12-17 of the patent, "For some reason it appears that the titanium catalysts have some specific applicability to the present process which is not generally possessed by other catalyst although it is

supposed that there may be some other catalysts which can be employed." Thus, the Coover process is restricted to using a titanium catalyst prepared prepolymer.

The Official Action states that the particle size of Coover's particles is between 30 and 70 mesh and asserts that this is within the range of typical granule size of 1-4mm. With respect to the 30 and 70 mesh being of granule size, this statement is specifically traversed. While it is true that granule size, as noted in the Official Action, is 1-4mm, 30 and 70 mesh are not within this granule size range. The larger the mesh size number, the smaller the particle size. A twenty mesh screen, also taught by Coover, allows larger particles to pass than does a thirty or seventy mesh as would be understood by one of ordinary skill in the art. See the attached mesh to millimeter conversion chart for U. S. Mesh. This indicates that 20 mesh is 0.841mm, 30 mesh is 0.595mm and 70 mesh is 0.210.

The size of the finely ground powder used in Coover is most evident from col. 2, lines 22-24 of the reference. This section states that the particles of prepolymer are capable of completely passing through a 20 mesh screen. One of ordinary skill in the art understands that a 20 mesh screen has openings of about 841 microns (0.841 mm). Accordingly, all particles in Coover must be smaller than 841 microns in order to pass through the openings in 20 mesh screen and the majority must be less than 30 mesh or 0.595 mm.

In this regard, Applicants wish to point out that the particle size range taught for the Coover prepolymer particles would be understood by one of ordinary skill to be a powder and not granules as required by the presently claimed process. See column 4, line 18 of Coover which refers to powder buildup and the Rinehart declaration of record, paragraph 6, which describe the polyester powders of Coover. See also USP 6,344,539 which at column 1 lines 18 -21 points out that it is know in the prior art that granules have at least one dimension greater than 1mm. Thus, one of ordinary skill in the art would clearly understand the meaning of granule as used in claim 56 and further amendment of this term is not necessary. Note also dependent claims 96-100 which specify particles size ranges consistent with the 1mm size for granules. The Rinehart declaration further notes that powders are not granules (pellets/chips).

The distinction between processes using granules and powders is well understood by one of ordinary skill in the art to which the invention pertains. As noted at column 1, line 57 through column 2, line 4 of the Rinehart USP 4,876,326 patent, "For example, it has generally been accepted practice to use polyester prepolymer in the form of pellets or chips in vacuum and static bed processes and finely ground powder in fluidized bed processes. The reason for this is that experience has shown that finely ground powders tend to agglomerate in vacuum processes, resulting in slower polymerization rates and a need to regrind the high molecular weight polyester resin produced. Experience has also shown that, in static bed processes finely ground powders will channel or fissure, resulting in uneven polymerization and prolonged polymerization rates. On the other hand, the use of pellets or chips in fluidized bed processes is not economically feasible in view of the velocity and volume of inert gas needed to suspend the pellets or chips and the size of the equipment required to do so. Thus, one of ordinary skill in the art of processing powders (Coover) would not look to the teachings of a pellet process (Kerpes) to modify a process using powders in view of the established differences in the processes as recognized in the art.

This is especially true in view of Coover, which at column 4, lines 69-71, tacitly teaches one of ordinary skill in the art not to use granules but to stay within the limits set forth above, which at column 2, line 23 describes the 20 mesh requirement for the particle size. This is a teaching away from the use of granules as required by the presently claimed invention. Applicants also note MPEP §2143.01, which states in part that, if a proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

To the contrary, the granules recited in claim 56 are larger than 800 microns. As indicated in, e.g., claim 97, the granules have a diameter of 1 mm to 5 mm. As also indicated in, e.g., claims 96 and 100, the granules have a volume between 1 mm^3 and 125 mm^3. Accordingly, as evidenced by both the claims of the instant application and the general understanding of the term granule by one of ordinary skill in the art, based on the evidence of record including patents and the Rinehart declaration, Applicants

respectfully submit that the granule recited in claim 56 is of a size generally larger than the finely ground particles disclosed in Coover.

That one of ordinary skill in the art of polyester resins knows that granules are larger than powders and that granules are different from powders is also established in the Rinehart patent referred to in the Rinehart declaration, of record. The Rinehart patent teaches that powders and granules are functionally different. Powders cannot be processed effectively using pellet/granule processing equipment due to chanelling as would be appreciated by one of ordinary skill in the art.

Applicants also submit that the assertion in the Official Action that Coover discloses particles having a size larger than 5 mm or between 3 and 5 mm represents a misreading of Coover as pointed out at the interview. This statement is specifically traversed. Column 2, lines 30-35 of Coover indicate that any particles located more than 5 mm from the surface of a bed of particles will be agitated into contact with an inert gas, not that the particles are 5 mm or larger in size. Similarly, column 5, lines 50-55 indicate that the depth of a bed of polymer particles is less than 5 mm and no more than 3 mm, not that the particles are in the range of 3 to 5 mm. Accordingly, it is most respectfully requested that this aspect of the rejection be withdrawn.

In view of the above, Applicants respectfully submit that the particles of Coover having a size of 841 microns or less do not disclose the granules recited in claim 56, and therefore the Coover reference fails to disclose each and every element of claim 56.

Applicants respectfully submit that a careful review of the Coover reference reveals no teaching of thermally crystallizing the prepolymer granules as recited in claim 56. Column 3, line 65 through column 4, line 11 of the patent appear to be the most relevant portion of the reference, but this portion of the reference does not disclose thermal crystallization as presently claimed. Coover discloses that if it is desired to crystallize the particles of the prepolymer, this may be achieved by slowly cooling the polymer before grinding (which would therefore crystallize the polymer ribbon, not the granule or powder). Only if "further" crystallization is desired is one to contact the particles with an organic volatile liquid compound. In the heating process disclosed in Coover and as to the term heat, heat is applied to remove the liquid compound after crystallization, and the heating and removing the liquid compound does not cause

crystallization. It is to leave the particles dry, see column 4, line 5. Further, Applicants respectfully submit that the type of heat needed to remove the liquid compound would be less than the range of heat for crystallization recited in claim 56 of the present application.

In view of the above, Applicants respectfully submit that Coover fails to disclose crystallization of the granules by heating as recited in claim 56 and therefore the Coover reference fails to disclose each and every element of claim 56 and the teaching of the Kerpes patent does not overcome these deficiencies. In fact, since the crystallization of Coover is of the ribbon, and not the powder, and the heating is to remove the solvent the basis of the Official Action for substituting the heating of Coover with the temperature of Kerpes is traversed.

In the Official Action, it is urged that Kerpes discloses a continuous process for PET production, which includes a crystallization step at 180-230 degrees C with reference to Table 1 and column 2, line 45. The Kerpes process relates to forming PET pellets which is noted at column 4, lines 9-13 to be a further condition which is a specific surface area ane the pellets are said to have a pellet weight of approximately 5 to 20 mg, preferably 8 to 15 mg (dp=1.98mm). Clearly, this is well outside of the requirement for particles passing a 20 mesh screen of Coover. Thus, even if one of ordinary skill in the art were to use Kerpes's temperature crystallization process over acetone/water the particle size requirement of Coover is not avoided. There is no reasoned explanation in the rejection as to why one of ordinary skill in the art would combine the teachings of a powder process with that of a granule process and to ignore the 20 mesh limitation of Coover as would be required for a tenable rejection.

As discussed at the interview, the following chart further contrasts the differences between the Coover (powder) and Kerpes (pellet) processes which illustrate in the far right hand column reasons why the teachings would not be combined and do not render the presently claimed subject matter obvious. The last column sets forth the exclusionary differences between Coover and Kerpes as would be appreciated by one or ordinary skill in the art.

Particle Form	Powder (c4,118);	Pellets (c4, L14)	
Particle Size	completely passing through 20 mesh (dp<0.914mm) screen with less 25% below 200 mesh (dp=0.069mm) (c4,123-25), preferably 30 (dp<0.605mm) – 70 mesh with larger particles causing discoloration and slower rates (c4, 169-73) no agglomeration (c5, 138)	One further condition is pellet pellet size 5mg, preferably 8-15mg. (dp= 1.98) c4, L9-13)	No pellet of Kerpes can pass through 20 mesh, Coover teaches small powders, Kerpes requires big particles Large particles of Kerpes destroys utility of Coover – color and IV
Particle Morphology	Crystallize then grind (c3,164-66)	Pelletize, then crystallize – amorphous c4, I14	Modification reverses the order.
Polymer I.V.	0.1 to 0.45 C1, L71; C4, L15 No less than 0.1, preferably 0.15 – 0.4 C1, L15-17	0.18 to 0.50 is a pre-condensate (c2,I63-65), and Kerpes teaches to melt polymerize to 0.60 – 0.95, preferably 0.65 to 0.75 (c3, I35)	No overlapping IV, easy to grind low crystalline IV, hard to pelletize
I.V. lift in SSP reactor	at least 0.3 unit higher than pre-polymer, and usually 0.4 or higher. C2, I38-40	0.05 to 0.15, preferably 0.07 – 0.12 (c3, I54-55)	Teach away from each other and no overlap
Organic Crystallization step	Optional – "if it is desired to enhance" c3, 172		

As summarized in the above table, the references are not combinable and do not render prima facie obvious the presently claimed invention.

Moreover, there are the well know differences in powder and pellet processes as noted in the prior art and discussed in the Rinehart declaration of record. Mr. Rinehart explains in his Declaration that powders are normally processed in horizontal reactors, but that when using pellets it is preferred to not use horizontal rotating reactors due to the creation of undesirable fines when feeding pellets to a horizontal rotating reactor (see Declaration, paragraphs 12 and 13). Accordingly, it is most respectfully requested that this rejection be withdrawn.

The teachings of the Tung et al reference do not overcome the deficiencies of the Coover and Kerpes references as discussed above. Tung et al note that the low molecular weight polyester prepolymers utilized in solid state polymerization are generally in the form of pellets or chips at column 1, lines 23-26. The reference notes the sticking problem and the advantage of forming a crystalline chip but in not using a thermal heating process for this but instead in the presence of an organic vapor. This is further evidence for not using the heat crystallization process of the present invention and teaches away from the combination of Coover and Kerpes. Accordingly, it is most respectfully requested that this rejection be withdrawn.

The rejection of claims 93, and 96-100 under 35 U.S.C. §103(a) as being unpatentable over Coover in combination with Kerpes and with Duh (US Pat. No. 5,449,701) has been carefully considered but is most respectfully traversed in light of the following comments. The teachings of Duh do not overcome the teachings of the primary references for the reason discussed above.

The Official Action urges that Duh discloses using prepolymer granules in the shapes of pellets, spheres, chips or cubes for solid state polymerization, see column 1 line 20. It is noted in the reference that the prepolymers are generally converted from the amorphous to the crystalline state prior to solid state polymerization in order to raise their sticking temperature. This is done in order to keep the pellets or chips of polyester prepolymer from sticking together as a solid mass in the solid sates polymerization reactor. However, Applicants note the comments above regarding the use of only finely ground particles or powder in the method and apparatus of Coover. Because Coover

discloses a horizontally oriented rotating reactor, shear force will be exerted on any relatively large granules in the shape of pellets, chips, cubes or spheres placed therein and cause the creation of undesirable fines. In fact, any pellets, spheres, chips or cubes placed therein will be reduced to powders, thus making a step of creating pellets, spheres, chips or cubes worthless.

Furthermore, Coover expressly notes at col. 4, lines 69-73 that particles having a size larger than 20 mesh (i.e., 0.8 mm) are undesirable for use in the method and apparatus of Coover because they tend to introduce discoloration and slow down the rate of molecular weight buildup. Thus, Applicants respectfully submit that, with respect to modifying the invention of Coover to use larger particles based on the teachings of Duh, the Coover reference clearly teaches away from any such modification. One of ordinary skill in the art reading the Coover reference will readily understand that using larger particle sizes is undesirable. The particle size as taught by Coover, must be in the range specified in Coover, see column 4, lines 70 and 71, and column 2, lines 23 and 24.

Accordingly, because one of ordinary skill in the art would not be motivated to increase the size of particles used in Coover based on express statements made in Coover, Applicants respectfully submit that the Coover reference may not be properly modified based on the teachings of Duh as proposed in the outstanding Official Action. Applicants therefore respectfully submit that a proper §103 rejection according to the guidelines set forth in MPEP §2143 has not been established and the rejection should therefore be withdrawn.

The rejection of claim 95 under 35 U.S.C. §103(a) as being unpatentable over Coover in combination Kerpes and Scannapieco (US Pat. No. 5,449,701) has been carefully considered but is most respectfully traversed in light of the following comments.

The Official Action urges that Scannapieco discloses using granules having carboxyl end group content that is less than 30% and that it would be obvious to use these granules in the method and apparatus of Coover in order to achieve a high rate of polymerization.

However, Applicants note the comments above regarding the use of only finely ground particles or powder in the method and apparatus of Coover. Because Coover

discloses a horizontally oriented rotating reactor, shear force will be exerted on any relatively large granules and cause the creation of undesirable fines. In fact, any granules placed therein will be reduced to powders, thus making a step of creating granules worthless.

Furthermore, Coover expressly notes at col. 4, lines 69-73 that particles having a size larger than 20 mesh (i.e., 0.8 mm) are undesirable for use in the method and apparatus of Coover because they tend to introduce discoloration and slow down the rate of molecular weight buildup. Thus, Applicants respectfully submit that, with respect to modifying the invention of Coover to use granules as taught in Scannapieco, the Coover reference clearly teaches away from any such modification. One of ordinary skill in the art reading the Coover reference will readily understand that using larger granules is undesirable. Accordingly, it is most respectfully requested that this rejection be withdrawn.

In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all of the claims now present in the application are most respectfully requested.

Respectfully submitted,

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MESH TO MICRON CONVERSION CHART

U.S. MESH	INCHES	MICRONS	MILLIMETERS
3	0.2650	6730	6.730
4	0.1870	4760	4.760
5	0.1570	4000	4.000
6	0.1320	3360	3.360
7	0.1110	2830	2.830
8	0.0937	2380	2.380
10	0.0787	2000	2.000
12	0.0661	1680	1.680
14	0.0555	1410	1.410
16	0.0469	1190	1.190
18	0.0394	1000	1.000
20	0.0331	841	0.841
25	0.0280	707	0.707
30	0.0232	595	0.595
35	0.0197	500	0.500
40	0.0165	400	0.400
45	0.0138	354	0.354
50	0.0117	297	0.297
60	0.0098	250	0.250
70	0.0083	210	0.210
80	0.0070	177	0.177
100	0.0059	149	0.149
120	0.0049	125	0.125
140	0.0041	105	0.105
170	0.0035	88	0.088
200	0.0029	74	0.074
230	0.0024	63	0.063
270	0.0021	53	0.053
325	0.0017	44	0.044
400	0.0015	37	0.037

Mesh Sizes and Microns

What does mesh size mean? Figuring out mesh sizes is simple. All you do is count the number of openings in one inch of screen (in the United States, anyway.) The number of openings is the mesh size. So a 4-mesh screen means there are four little squares across one linear inch of screen. A 100-mesh screen has 100 openings, and so on. As the number describing the mesh size increases, the size of the particles decreases. Higher numbers equal finer material. Mesh size is not a precise measurement of particle size.

What do the minus (-) and plus (+) plus signs mean when describing mesh sizes? Here's a simple example of how they work. –200-mesh would mean that all particles smaller than 200-mesh would pass through. +200 mesh means that all the particles 200-mesh or larger are retained.

How fine do screens get? That depends on the wire thickness. If you think about it, the finer the weave, the closer the wires get together, eventually leaving no space between them at all. For this reason, beyond 325-mesh particle size is usually described in "microns."

What is a micron? A micron is another measurement of particle size. A micron is one-millionth of a meter or one twenty-five thousandth of an inch.

Sieve Mesh #	Inches	Microns	Typical Material
14	.0555	1400	-
28	.028	700	Beach Sand
60	.0098	250	Fine Sand
100	.0059	150	-
200	.0029	74	Portland Cement
325	.0017	44	Silt
400	.0015	37	Plant Pollen
(1200)	.0005	12	Red Blood Cell
(2400)	.0002	6	-
(4800)	.0001	2	Cigarette Smoke

The mesh numbers in parentheses are too small to exist as actual screen sizes; they are estimates included for reference.

This table was adapted from a post made by Ken Kosanke to the PML and previously published in a PGII Bulletin. It has also been modified and edited for use on this site.